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ATTACHMENT to:

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MEMORANDUM FOR: Chief, Technical Services Group, NPIC

ATTENTION : Chief, Technical Operations Staff, TSG/NPIC

SUBJECT : RED Monthly Report (November 1971)

Significant Items of Interest for November 1971:

1. Image Comparison Microstereoscope. During November, demonstrations of the ICM with operational material were given to C/TSG, the Director's Office 25X1 25X1A visiting from Headquarters.

Under ESD guidance trained a group of PI's from all components in ICM operation, and the Viewing Mode Evaluation commenced. 25X1A 25X1A 25X1A

2. Stereo Scanning Utility Study Four days of training in the operation of the HPSC were given to personnel by IEG/PHD. Information gained will be applied to final design of the test packages. Indications are that some modifications to schedule will result. A modified C-i-S estimate (previously reported) will be prepared. 25X1A

Virtually all test imagery has been reproduced, cataloging is nearly complete, and annotation of the film, in conjunction with senior IEG PI's, will start 1 December 1971.

3. Automatic Focus Control Breadboard Progress in the design and fabrication of the B/B has been delayed by personnel commitments to other NPIC contracts. A three-month, no-cost extension is anticipated. The preliminary experiment is planned for December 1971. 25X1A 25X1D

4. CRT Image Quality Evaluation The major activity for November was to assemble and test the video chain between the magnetic tape input and the CRT display. Progress to date has been excellent except for delays in the delivery of equipment from vendors. Expenditures are on target. However, reformatting of magnetic tape data--given by NPIC--may require a small amount of additional funding. There are no unresolved problems or contractual matters pending. 25X1A 25X1A 25X1A

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GROUP 1
Excluded from automatic downgrading and declassification

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25X1A 5. Digital Image Storage Study [redacted] The contract has been underway for three weeks and the initial activity 25X1A has been to educate [redacted] about the Z system and visiting potential vendors working in the area of mass memory systems. Detailed plans have been laid as to methods to be employed in evaluating the various memories. There are no unresolved problems or contractual matters pending.

6. Wide-Field, High-Power, Anamorphic Stereoviewer 25X1A [redacted] Approximately 99% of the optical glass has been received by the contractor and is in work. One of the objectives (9X) has been completed and is being tested on the optical bench. Preliminary subjective evaluation indicates that this is a satisfactory item and the basic design is good. 25X1A A change-in-scope has been authorized to alter the eyepiece convergence angle in keeping with [redacted] human engineering recommendations.

25X1A 7. Lenticular Rear Projection Screen [redacted] A breadboard of the screen production machine has been made and tested. Results were good and work is beginning on the full size (30" x 30") version. A small sample (6" x 6") screen will be produced and delivered in January 1972. This sample will be used to determine engineering feasibility. It provides a major decision point, i.e., whether to proceed 25X1A with the large size screen production or not.

8. Viewing Systems Study [redacted] The first four sections of Volume II of the Viewing Systems Handbook are nearing completion and will be ready for final review by the sponsor's Project Officer during his visit to the contractor's facility in December 1971.

25X1A 9. Automated Coordinate Display [redacted] The sonic measuring array and the signal generator were delivered 25X1A by the vendor and installed on a light table [redacted] Initial tests of X-Y measuring accuracy were very good and the technique shows promise. However, an unforeseen problem became evident in that the system, as currently configured, 25X1A is sensitive to ambient RF noise--at least in the [redacted] plant. Whether the ambient RF environment at NPIC is a problem will not be known until the system is tested here. This test is being planned.

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25X1A 12. TSG/ESD, IEG/PHD, and RED/SDB completed the on-site preacceptance test for the High Precision Stereo Comparator. ESD and PHD will perform the final acceptance tests during the next three months.

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25X1A 13. RED/SDB and ESD performed the preacceptance tests on the PI Print Station (PIPS) during the period 29 November to 1 December 1971.

25X1A 14. instituted a history file on RADCIS (new name for PICCIP, the R&D contract information program) to reduce storage costs for completed contracts

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25X1 15. RED/SDB has prepared a development objective for a "Zoom Viewing System PI Use Analysis". This has been forwarded to the Chief/TSG with the request that ESD perform the analysis.

16. The Step and Repeat Printer project has been suspended. Westover AFB has had a somewhat similar device built

25X1A and it will be delivered to Westover this month for operational testing. SDB will follow the progress of these tests.

17. Proposals have been received on the following projects and are being evaluated in RED/SDB:

25X1A a. Dual Magnification Viewer

25X1A b. Contrast Enhancement Processor Tech-

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c. Interactive viewing with a modified [redacted] Intensity Stereo Zoom Microscope

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d. Vertical Light Table [redacted]

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e. Split-Field Viewer [redacted]

f. Advanced Photometer [redacted]

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g. Modification of 10" X 10" Stage Stereocomparator [redacted]

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[redacted]

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25X1A 19. [redacted] Final Report. The final report (25 copies) on contract [redacted] ("Signal to Noise Optimization") was delivered to NPIC on 19 November 1971 [redacted] Five additional copies with glossy prints will be delivered in the near future.

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25X1A 20. Color Vocabulary [redacted] RED/ATB/HFS personnel have completed an evaluation of four color-related documents developed under the FY-71 [redacted] contract. A recommended three-level color vocabulary has been adopted by IEG as its official color designation system. The vocabulary (a color glossary) and an extensive literature review of color aerial photography will soon be distributed to the Center and the intelligence community, along with a recommendation that the vocabulary be adopted as a community color designation system.

21. In-House Research and Support:

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22. Preliminary vacuum evaporations were made in-house in preparation for placing silver reflecting layers onto DP's. This technique demonstrated an exciting capability for simultaneously enhancing contrast and resolving power using very low contrast resolution targets. In-house experiments to date have concentrated on establishing correlation between the evaporation parameters and the attained density of the silver reflectors. It is estimated that preliminary experiments will be completed and that initial trials using classified imagery can begin by mid- to late January.

25X1A 23. Electron Microscopy Consultation [redacted]

25X1A [redacted] visited [redacted] to set up an experiment to compare light microscopy, transmission electron microscopy and scanning electron microscopy for examination of high resolution images. High and low contrast images of resolution targets over 1000 lines/mm were exposed [redacted] in their microcamera and processed at NPIC in both normal and bleached modes. The film samples were given [redacted] to obtain the best possible micrographs by light and transmission electron microscopy (TEM). TEM requires that a plastic replica

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be made of an image surface because electrons will not penetrate a normal film. The replica is shadowed with evaporated metal providing a high resolution representation of the original surface. Preliminary experiments indicated that a replica could be removed from the film surface and the image relief was easily seen by light microscopy with phase contrast attachments. The replicas will also be examined with the transmission electron microscope. The replication technique attempted requires refinement and will be used as a starting point for in-house experiments in electron microscopy of images. The basic point to be determined is whether a high resolution image in film has more or less information in the surface relief than in the silver image in the emulsion. If the surface relief contains the same or more information than in the silver image, the electron microscopy may have an advantage since depth of focus is several times greater than the light microscope at its high magnifications (e.g., 1000x) and also has a magnification range up to 100,000x. Replicate film samples will also be examined by scanning electron microscopy (SEM) SEM has the advantage that replication is not necessary and magnifications less than 1000x are easier to control. In-house work on variations in processing and film selection to enhance relief will also be carried out with replication experiments.

24. Contact Lens Evaluation Program. RED has recommended the cancellation of the NPIC Contact Lens Evaluation Program. Evidence recently gathered from several sources indicate that persons wearing eyeglasses should be able to perceive the entire field of view of the Wide-Field, High-Power, Anamorphic Stereo Viewer. The wide field instrument has an extremely short eyepoint, and contact lenses were originally recommended as a means of correcting visual anomalies while allowing the interpreter to move sufficiently close to the instrument to appreciate the full field.

25. Meetings, Briefings, etc.:

a. briefed the Chief/TSG and the Chief/RED on focus and magnification problems of the Zoom light table system. This detailed briefing also included the advantages and disadvantages of obtaining additional magnification by utilizing 15x eyepieces and 3x objective lenses.

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25X1A b. [redacted] briefed Chief/RED and RED personnel on several advanced viewing systems (proposed by contractors in unsolicited proposals) to accommodate imagery from future acquisition systems. Included in this report were: UV projection, aerial image viewer, front projection viewing, an advanced PI roll film stereo viewer system, and a dual magnification viewer.

25X1A c. [redacted] briefed [redacted] Executive
25X1A Director-Comptroller/CIA, on the High Precision Stereo Comparator.

25X1A d. [redacted] met with OSP personnel to coordinate the Dry Silver Development Program with OSP special requirements.

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25X1 e. [redacted] met [redacted] a
25X1A [redacted] representative in regard to their color
25X1A bibliography work. SDB provided them with the
color work and bibliography prepared [redacted]
for the Research in Mensuration Instruments Program.

25X1A f. [redacted] briefed the EXRAND Committee on the High Precision Stereo Comparator Program; a tour of the HPSC site followed the briefing.

25X1A g. [redacted] discuss problems with image scanning viewers and film gate heat problems.

25X1A h. [redacted] attended the EXRAND Procurement Coordinating Team meeting in regard to future procurement of light tables.

25X1A i. [redacted] attended a coordination meeting at
25X1A ACIC on the new USAF optical rectifier.

25X1A j. [redacted] in regard to light transmission requirements for microstereoscopes.

25X1A k. [redacted] attended "A Symposium on Sampled Images" conducted [redacted]
25X1A [redacted] on 1 November 1971 [redacted]
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25X1A l. [redacted] (NAVOCEANO) visited [redacted] on 15 November 1971. Scans of oceanographic areas were displayed and manipulated on the Image Translator. [redacted] has requested future support from RED/ATB on the order of one day per month.

m. A meeting was held at Ames Building on 30 November to discuss future efforts in digital image manipulation. Present were [redacted] (NPIC/TSG/RED/ATB), [redacted] (ARPA), and DDS&T/ORD personnel.

n. Search Performance (COMIREX) - RED/ATB/HFS personnel briefed [redacted] on the Center's search performance research program, a portion of the [redacted] IIRP.

o. [redacted] A company capabilities briefing was presented to TSG personnel [redacted] on 8 November 1971.

p. [redacted] (RED optics consultant) was briefed by RED/ATB/HFS on [redacted] FY-71 Advanced Viewing System research program [redacted] will review and critique this research.

q. [redacted] was briefed on the continuation of the Photoscience Support Program. The first draft of the PAR was completed and started through approval channels.

r. On 17 November 1971, [redacted] presented a briefing to the IEG Branch and Division Chiefs detailing progress to date on Digital Image Manipulation and requested inputs as to targets of high priority interest to them that might profit from such manipulation. A number of requirements were immediately suggested by IEG and additional requirements continue to come in. Those that can be improved by in-house manipulation are being processed by RED/ATB on the Image Translation Facility as rapidly as possible. Images requiring more sophisticated processing will have to wait for additional manpower or contractual assistance to employ the full spectrum of techniques.

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26. Training:

25X1A a. attended a course on "Specifications for Computer Selection" at DODCI.

25X1A b. attended an Advanced Management (Planning) Course during 14-17 November.

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27. Personnel:

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Deputy Chief
Research & Engineering Division
TSG/NPIC

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